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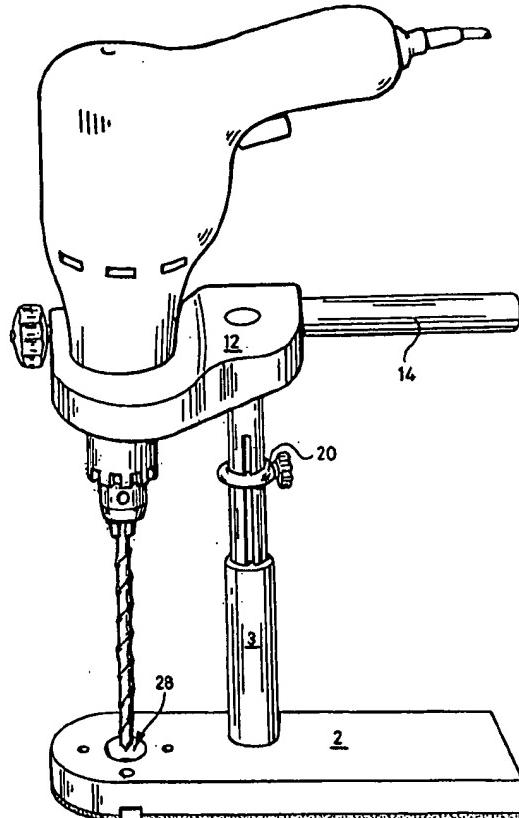
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(71)(72) Applicants and Inventors: WILKINS, Paul, Gordon [GB/GB]; 51 Old School Lane, Milton, Cambridge CB4 6BS (GB). BRAIN, Robert, Gilbert [GB/GB]; Temple Cottage, 21 Elvendon Road, Goring-on-Thames, South Oxon RG8 0DP (GB).		
(74) Agent: STONE, Patrick; 28 Edenside Drive, Attleborough, Norfolk NR17 2EL (GB).		

(54) Title: DRILL GUIDE WITH DUST COLLECTOR AND DETECTOR FOR SENSING HIDDEN ITEMS

(57) Abstract

A drilling aid for use with a power drill comprising an abutment plate (2) for lying against the surface to be drilled, a collar (12) for attachment to the power drill above the drill bit holder, and one or more columns (3) of adjustable length interconnecting the abutment plate and the collar.



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DRILL GUIDE WITH DUST COLLECTOR AND DETECTOR FOR SENSING HIDDEN ITEMS

This invention relates to a drilling aid for use with a power drilling tool.

According to the invention, there is provided a drilling aid for use with a power drilling tool, comprising an abutment member for lying against a surface to be entered by the drill bit, and attachment means for fixing the abutment member to the drilling tool in a manner which in use allows movement of the tool towards the abutment member, in the axial direction of the drill bit, as the drill bit penetrates the surface to be drilled.

Preferably the abutment member is in the general form of a plate cut-away, e.g. apertured, in axial alignment with the drill bit when the drilling aid is fixed to the tool. A targeting insert for the drill bit may be fittable in the abutment member aperture.

The attachment means preferably comprises a part for fitting to the stem of the drill above the drill bit holder and one or more columns extending to be adjustable in length between the fitting part and the abutment member. The columns are preferably spring loaded, but could alternatively be pneumatically or hydraulically loaded, and in general loaded to urge the abutment member axially away from the body of the drilling tool. Telescopic columns may be employed, or columns sliding through rings incorporated in the fitting part.

The fitting part may, for example, comprise or include a size-adjustable and/or tightenable collar.

The abutment member may, in its abutment face, have one or more channels for carrying away drilling dust or swarf from the drilling point. A pouch or plastics

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cup for collection of such dust or swarf may be carried by or attachable to the abutment member, or possibly suspended between two columns. Alternatively or additionally, means may be provided for connection of a vacuum cleaner to collect the dust or swarf, especially useful in the drilling of hazardous material. Moreover, said abutment face may have a friction finish, for example in the form of a non-slip coating or facing layer, for preventing slippage of the abutment member relative to the surface to be drilled and/or to prevent marking or other damage to said surface.

The abutment member may incorporate or be adapted for attachment thereto of a detector for sensing hidden items, such as studwork and/or metal pipes or electric cables, beneath the surface to be drilled.

The drilling aid may also be equipped with means for in use adjustably limiting movement of the drill towards the abutment member, whereby to determine the depth of a hole being drilled. Such means may take the form of a stop on one or more of the aforesaid columns. A measuring scale may be provided on the column, for enabling setting of the stop to a selected depth of drilling.

The or each column comprises two parts slid able relative to one another and means such as a rib and groove may be provided to prevent one part twisting relative to the other. If, as may often be preferred, two or more columns are employed, such ribs and grooves are inessential. The use of two or more columns also eases tolerances of manufacture, as compared to the use of a single column.

Horizontal and/or vertical spirit levels may be incorporated in the abutment member.

It has already been mentioned that the abutment face of the abutment member

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may have a friction finish. Alternatively or additionally, however, the abutment member may be adapted to receive suction cups, thereby to prevent slipping when said member is held against a very smooth surface, such as wall tiling.

Alternatively or additionally, the abutment member itself may possess a limited degree of flexibility out of a shape in which the abutment face is concavely curved, so as both to conform to and grip the surface to be drilled. Such an abutment member is especially suitable for use, for example, when a surface such as a shaped car body is to be drilled. As a further refinement, in association with the above-described flexibility, means may be provided on the abutment member for adjusting the shape of the abutment face.

The abutment member may also include or be adapted to receive an extension piece carrying a pin for location in a hole already drilled, whereby to enable a second hole to be drilled at an adjustable selected spacing from the first hole. In this way a line of holes can be drilled at equal spacings, for example along a piece of timber received into a channel in the abutment face of the abutment member, for example the channel previously mentioned in connection with dust and swarf collection. A matching line of holes can be similarly drilled in another piece of timber, for example to facilitate dowelling.

A development of this method, using an elongated extension piece in connection with spirit levels on the abutment member, enables a sequence of holes to be drilled in a vertical and/or horizontal line, for example to facilitate the erection of shelving on a wall.

The invention is further described with reference to the accompanying drawings, in which:-

Figure 1 is a pictorial view of a power drill in use, when fitted with the drilling

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aid;

Figure 2 is a pictorial view of the drilling aid;

Figure 3 is a pictorial view of the drilling aid, when fitted to a power drill;

Figures 4 and 5 illustrate use of a dust collection pouch;

Figure 6 illustrates use of an accessory for enabling drilling of a line of evenly spaced holes; and

Figures 7 and 8 illustrate use of a modified accessory for use in drilling a line of holes.

Referring first to Figure 1, there is shown a power tool 7, in use when the drilling aid in accordance with the invention is fitted thereto. In this figure, the base plate of the drilling aid is referenced 2, a dust collection pouch 1, and a telescopic column 3. Holes 4 are provided in the base plate for the fitting of accessories, such as a hole locator 5. Spirit levels on the base plate are referenced 6.

The drilling aid itself is shown in Figure 2. It comprises the base plate 2, which has the spring loaded telescopic column 3 connecting said base plate to a collar 12 having a handle 14. The collar 12 is adapted to be tightened by use of finger knob 16 around the stem of the power drill just above the bit holder. Collets 18 enable the collar 12 to fit power drills of differing size and manufacture.

Mounted on the telescopic column 3 is an axial adjustable depth ring 20 which, in association with a scale 22 marked on the column, enables a hole of preselected depth to be drilled.

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A rib and groove 23 prevent one part of the column angularly twisting relative to the other part.

The base plate 2 itself carries the horizontal and vertical spirit levels 6 and an embedded studwork, metal and/or cable sensor (not visible). Compartment 26 accommodates batteries for supplying electrical power to the sensor.

Most importantly, the base plate 2 is apertured at 28 in axial alignment with the drill bit when, as shown in Figure 3, the drilling aid is fixed to the power drill by means of the collar 12.

The abutment face of the base plate 2, which is formed by a non-slip rubberised layer 30, has transverse and longitudinal channels 32 therein, provided in part to carry drilling dust away from the drilling point to be collected by the pouch 1 for which attachment points are provided at 34.

The base plate also has the small apertures 4 enabling the attachment of hole spacing accessories, as described later, and slots 34 for attachment of the dust collection pouch 1.

It will be understood that, in use (Figure 1), the drilling aid with power tool fitted is pressed against the surface to be drilled with the centre of the aperture 28 at the drilling point. During drilling, the drill bit is thereby prevented from wandering and, by compression of the telescopic column 3 against the action of its biassing spring, the power tool is able to move towards the base plate 2 to drill a straight hole to a depth selected by use of the stop ring 20.

Figures 4A, B and C illustrate use of the dust collection pouch 1. This secures by means of lugs 40 to the attachment points 34 on the base plate 2, in the manner shown in Figures 4B and 4C, whereby in use (Figure 4A) to collect

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drilling dust dropping into said pouch via one of the channels in the abutment face of the base plate. The pouch 1 may be open mouthed (Figure 4B) or may have a dust entry slot (Figure 4C).

Figures 4A, B and C show the dust collection pouch 1 fitted at the end of the base plate 2 remote from the drilling point aperture 28. As shown in Figures 5A and 5B, the pouch 1 may instead be fitted at the end of the base plate 2 adjacent the drilling point aperture 28.

Figures 6A and 6B illustrate an accessory in the form of a hole locator 4 having a peg 44 which locates as a tight fit in one of the above-mentioned small apertures 4 in the base plate 2. The locator has a slot 46 along which a locating pin 48 is adjustably securable in position, whereby, as shown in Figure 6B, to enable evenly spaced holes to be drilled along a piece of timber over which the base plate 2 locates by means of one of the channels in its abutment face. Although not shown, trims, possibly of adjustable thickness, may be adapted to fit at one side of the channel to enable adjustment of the width of the channel in the abutment face of the base plate so that it matches the width of the piece of timber. The locator 4 shown in Figures 6A and 6B facilitates the drilling of lines of evenly spaced holes for a variety of purposes, and in particular dowelling. For these special purposes, the normal base plate may be replaceable by a channelled base plate specifically suited to the purposes in question (i.e. the abutment plate fits detachably to the one or more telescopic columns to enable an alternative plate to be fitted).

Figures 7A, B and C illustrate an alternative locator 50. This locator is much more elongated than the locator shown in Figure 6. It is again attachable to the base plate 2 by insertion of pegs 52 into the small apertures 4 and, as shown in Figure 7A, can be turned over to enable it to extend away from the base plate in any one of three positions (in use vertical, left horizontal and right horizontal).

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The locator 50 has a longitudinal slot 54 along which a locating pin 56 is movable and securable in a chosen position of adjustment. The pin 56 locates in a previously drilled hole to enable a further hole to be drilled at a pre-selected distance from the first hole. Thus, as exemplified by Figure 8, a vertical or horizontal line of holes can be drilled, evenly spaced or at differing selected spacings as required, for example in a wall to facilitate the erection of shelving.

While, for purposes of spacing adjustment, the locators of Figures 6 and 7 have an adjustable pin, instead the locator 4 and the locator 50 may be adapted to slide in and out of a slot in the base plate to an extent selectable for spacing adjustment, in which case the pin 48 or 56 may be fixed at the free end of the locator.

Although not illustrated, it is also possible to provide for the fitting of suction cups to the base plate, in order to facilitate its location against a very smooth surface, such as wall tiling, without risk of slipping.

It is also possible to manufacture the base plate of a slightly flexible material, thereby to enable it to conform to a non-flat surface to be drilled, for example a slightly curved region of a vehicle body. This option can be extended to include the option of pre-shaping the base plate to match a non-flat surface to be drilled. This can be achieved, for example, by the provision of a rigid bar attached to the flexible base plate via two or more length-adjustable pillars.

Modifications possible within the scope of the invention include the use of two or more telescopic columns. Two or more columns may often be preferred and, if employed, there is no requirement to prevent one part of each column from twisting relative to the other part.

Furthermore, whether one or more columns are employed, the telescopic columns

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can be replaced by columns which slidably extend through one or more rings on the collar which attaches to the power drill. The aforesaid rings can be incorporated in an annular member rotatable around a stub on the collar so that, with the aid of a fixing screw, the relative orientations of the collar 12 and the base plate 2 can be set to a chosen relationship.

Instead of a pouch for collection of dust and swarf, a plastics cup or the like can be employed, possibly hooked between two columns. Alternatively or additionally, a fitting may be provided for connection of a vacuum cleaner hose whereby dust and swarf, especially if of a hazardous nature, can be sucked away.

Again, a targeting insert for the drill bit may be locatable in the aperture 28 in the base plate 2. Such an insert may comprise a transparent disc or a disposable card with a small central hole for the drill bit.

In practice, it is expected that a range of drilling aids, generally as above-described, will be made available on the market, suitable both for DIY use and for industrial use, with accessories either included in the package or offered separately.

Claims

1. A drilling aid for use with a power drilling tool, comprising an abutment member for lying against a surface to be entered by the drill bit, and attachment means for fixing the abutment member to the drilling tool in a manner which in use allows movement of the tool towards the abutment member, in the axial direction of the drill bit, as the drill bit penetrates the surface to be drilled.
2. A drilling aid according to claim 1, wherein the abutment member comprises a plate cut away or apertured in axial alignment with the drill bit when the drilling aid is fixed to the tool.
3. A drilling aid according to claim 1, including a targeting insert for the drill bit for location in the cut away or aperture in the base plate.
4. A drilling aid according to any of claims 1 to 3, wherein the attachment means comprises a part for fitting to the drill above the drill bit holder and one or more columns extending to be adjustable in length between the fitting part and the abutment member.
5. A drilling aid according to claim 4, having a telescopic column or columns.
6. A drilling aid according to claim 4, having columns which are slidable through rings incorporated in the fitting part.
7. A drilling aid according to claim 6, wherein the rings are incorporated in an annular member rotatable around a stub on the fitting part, whereby, in conjunction with a fixing screw, the relative orientations of the attachment member and the base plate can be preset.

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8. A drilling aid according to any of claims 4 to 7, wherein the fitting part comprises a size-adjustable and/or tightenable collar.
9. A drilling aid according to any of claims 1 to 8, wherein the base plate has one or more channels for carrying dust and/or swarf away from the drilling point.
10. A drilling aid according to claim 9, including a pouch, cup or vacuum hose connector for receiving dust and/or swarf delivered by the channel or channels.
11. A drilling aid according to any of claims 1 to 10, wherein the face of the abutment member has a non-slip finish.
12. A drilling aid according to any of claims 1 to 11, wherein the abutment member incorporates or is adapted for attachment thereto of a detector for sensing hidden items, such as studwork and/or metal pipes or electric cables, beneath the surface to be drilled.
13. A drilling aid according to any of claims 1 to 12, wherein the drilling aid is equipped with means for use in adjustably limiting movement of the drill towards the abutment member, whereby to determine the depth of a hole being drilled.
14. A drilling aid according to claim 13, wherein said depth determining means comprises a stop on the column or one of the columns.
15. A drilling aid according to claim 14, wherein the said column is provided with a measuring scale.
16. A drilling aid according to any of claims 1 to 15, wherein horizontal and/or vertical spirit levels are incorporated in the abutment member.

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17. A drilling aid according to any of claims 1 to 16, wherein the abutment member is adapted to receive suction cups.
18. A drilling aid according to any of claims 1 to 17, wherein the abutment member has a limited degree of flexibility to enable it to conform to a surface being drilled.
19. A drilling aid according to any of claims 1 to 18, wherein the abutment member includes or is adapted to receive an extension piece carrying a pin for location in a hole already drilled, whereby to enable a second hole to be drilled at an adjustable selected spacing from the first hole.

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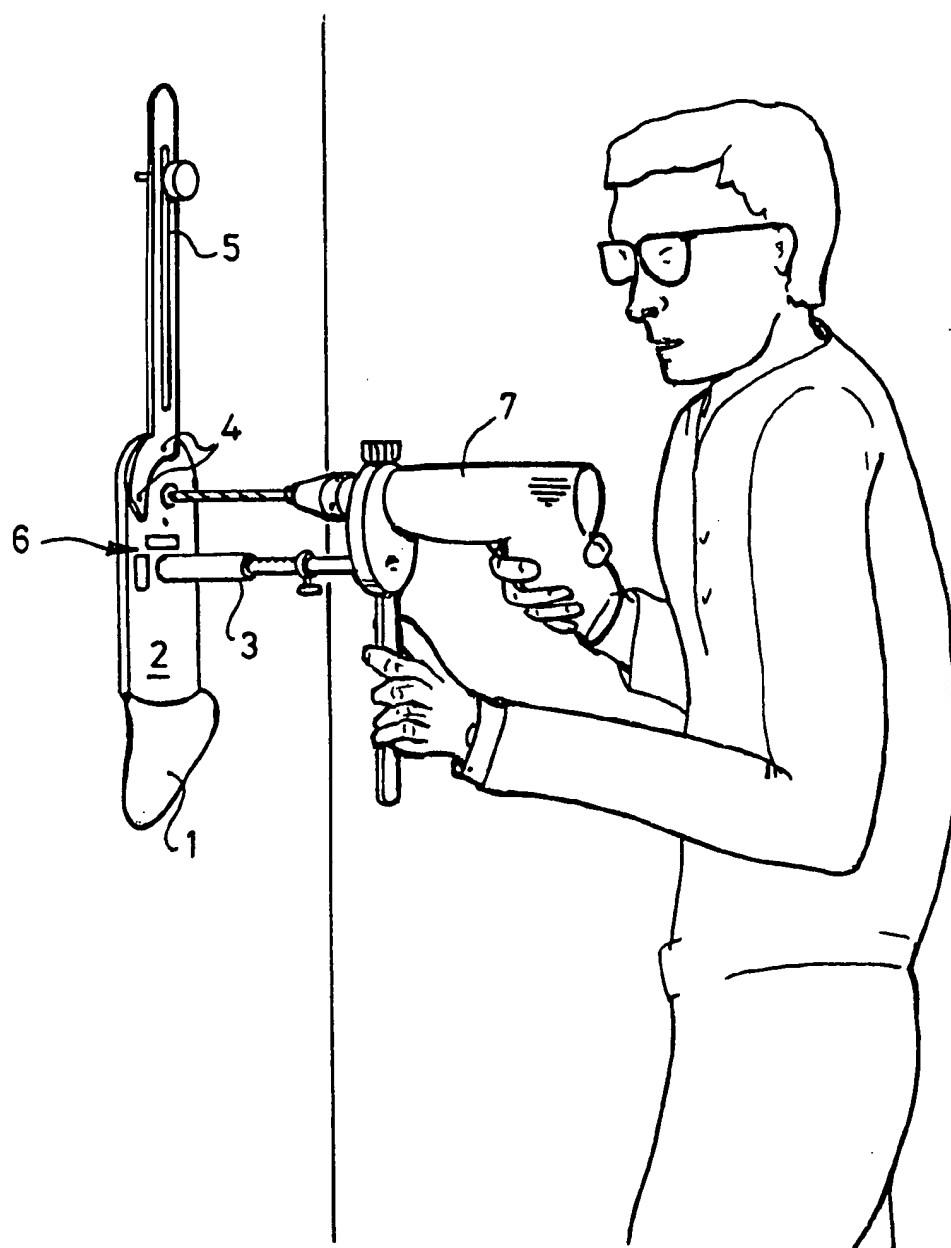


Fig. 1

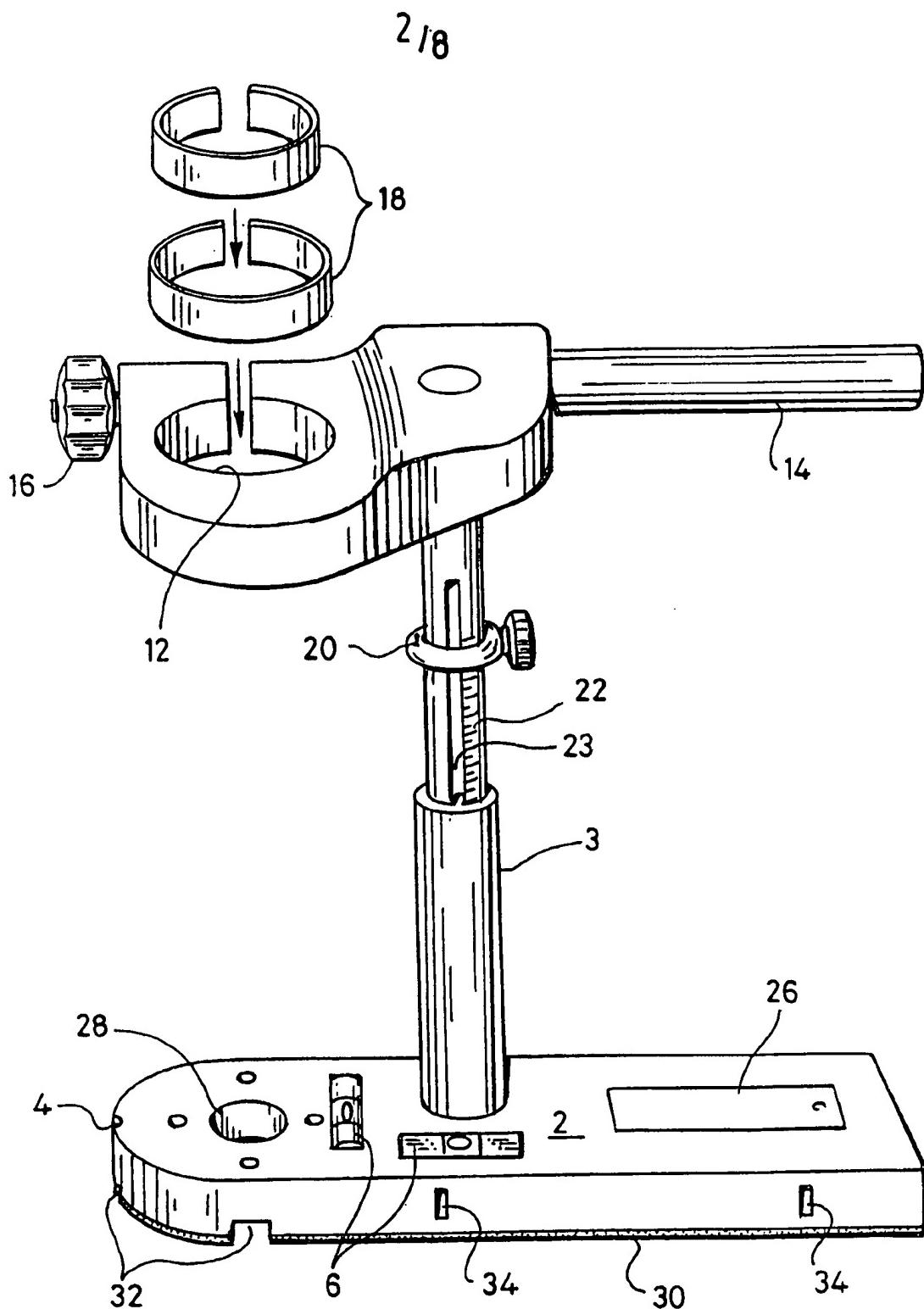
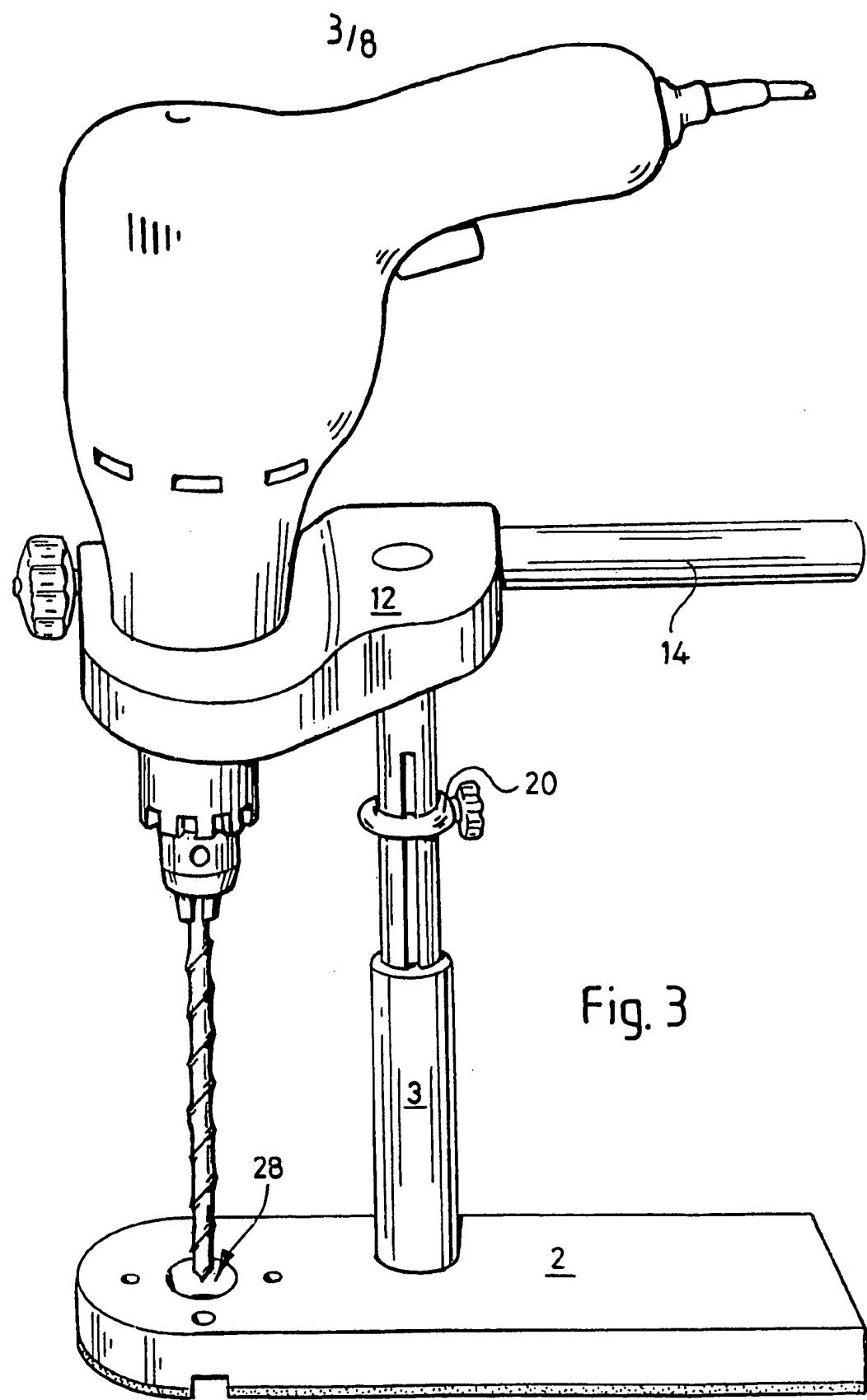


Fig. 2



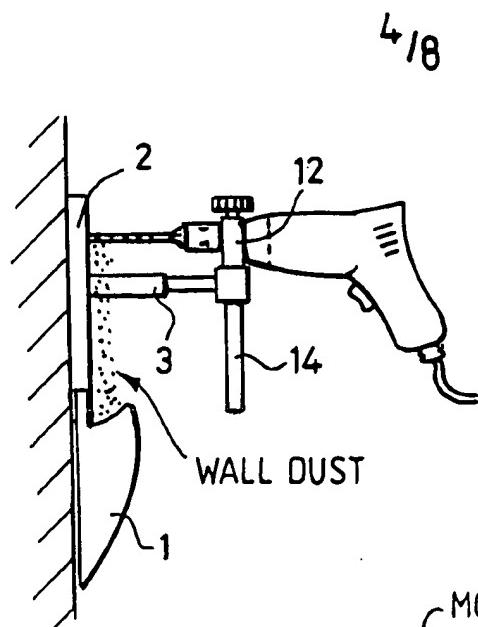


Fig. 4A

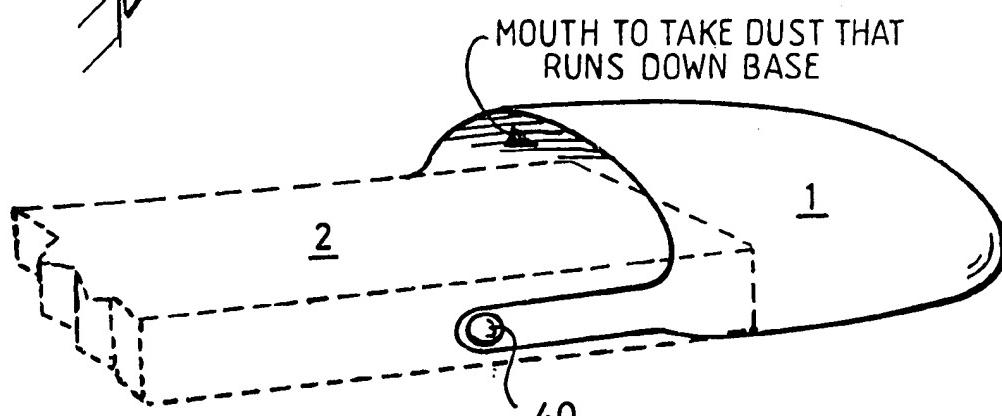


Fig. 4B

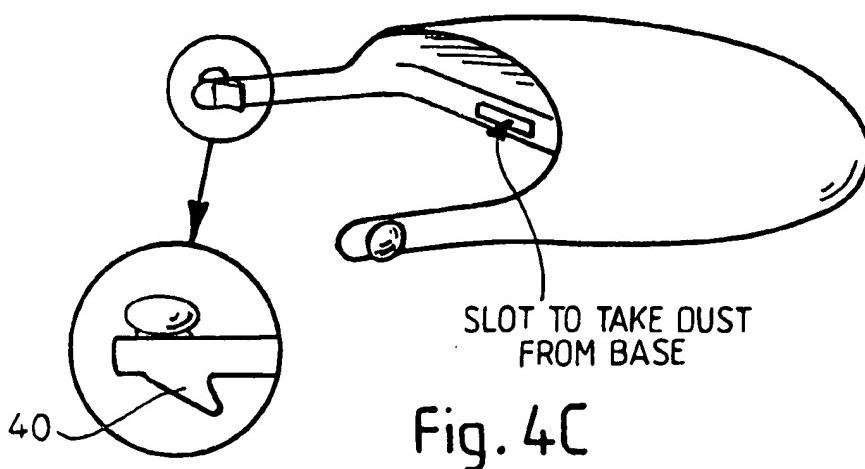
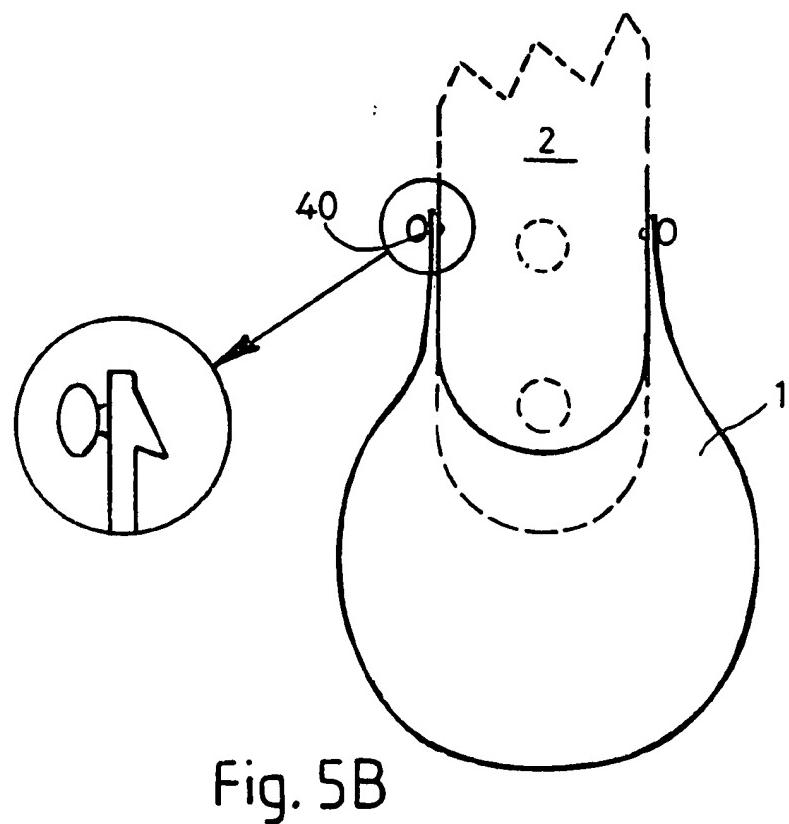
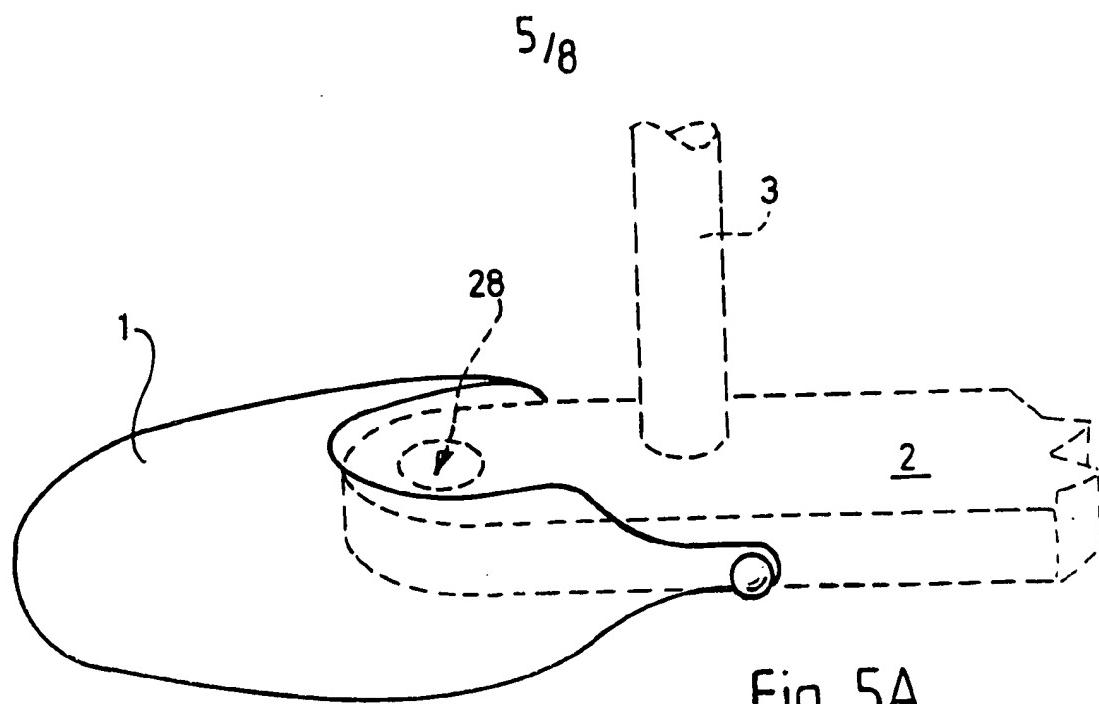


Fig. 4C



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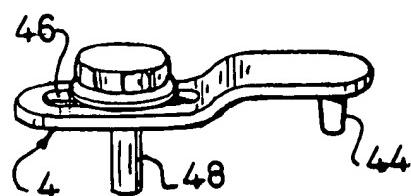


Fig. 6A

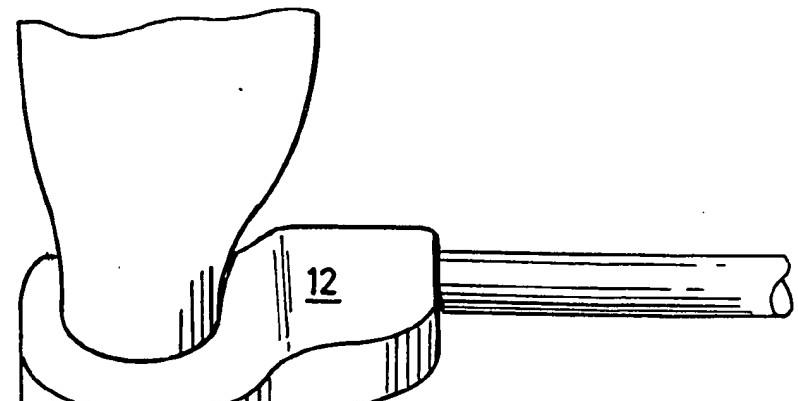
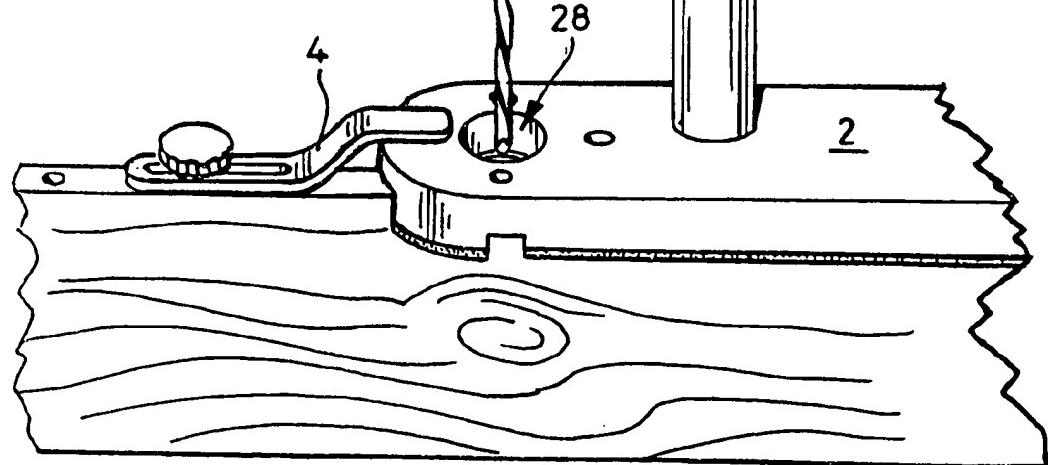


Fig. 6B



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THREE POSSIBLE
POSITIONS OF HOLE
LOCATOR ATTACHMENT

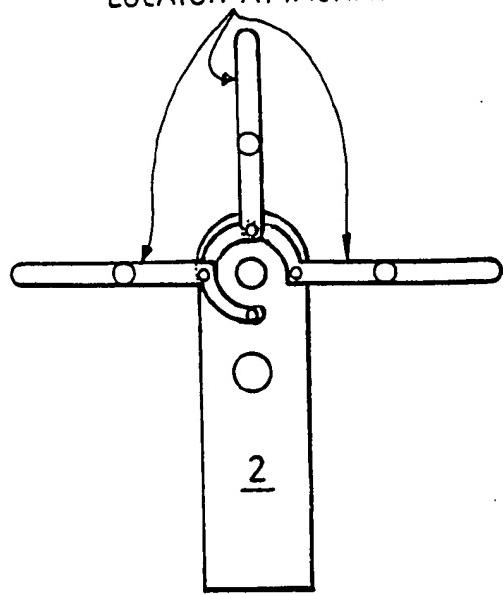


Fig. 7A

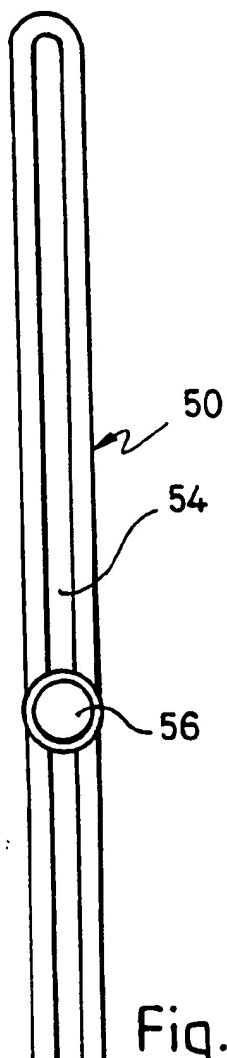


Fig. 7B

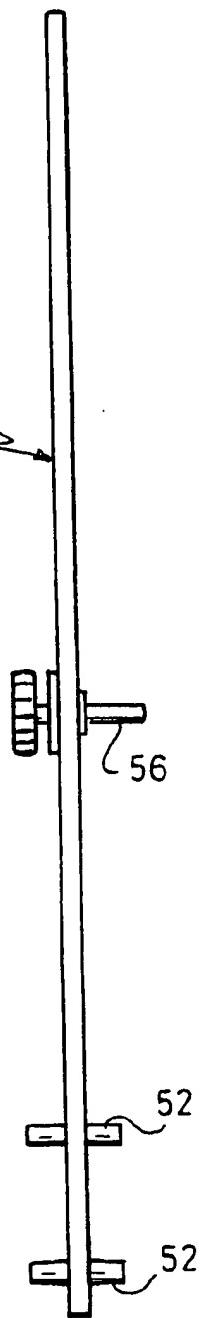
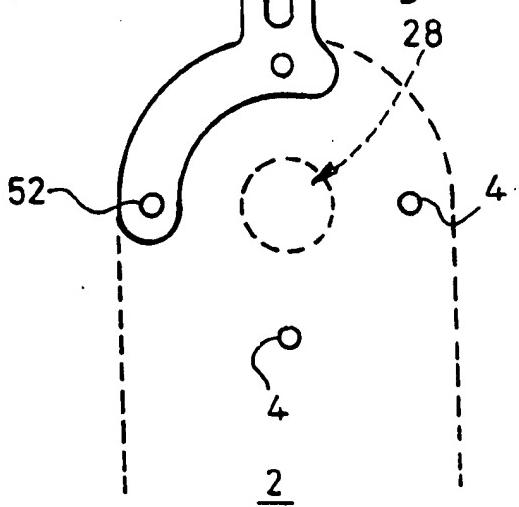


Fig. 7C

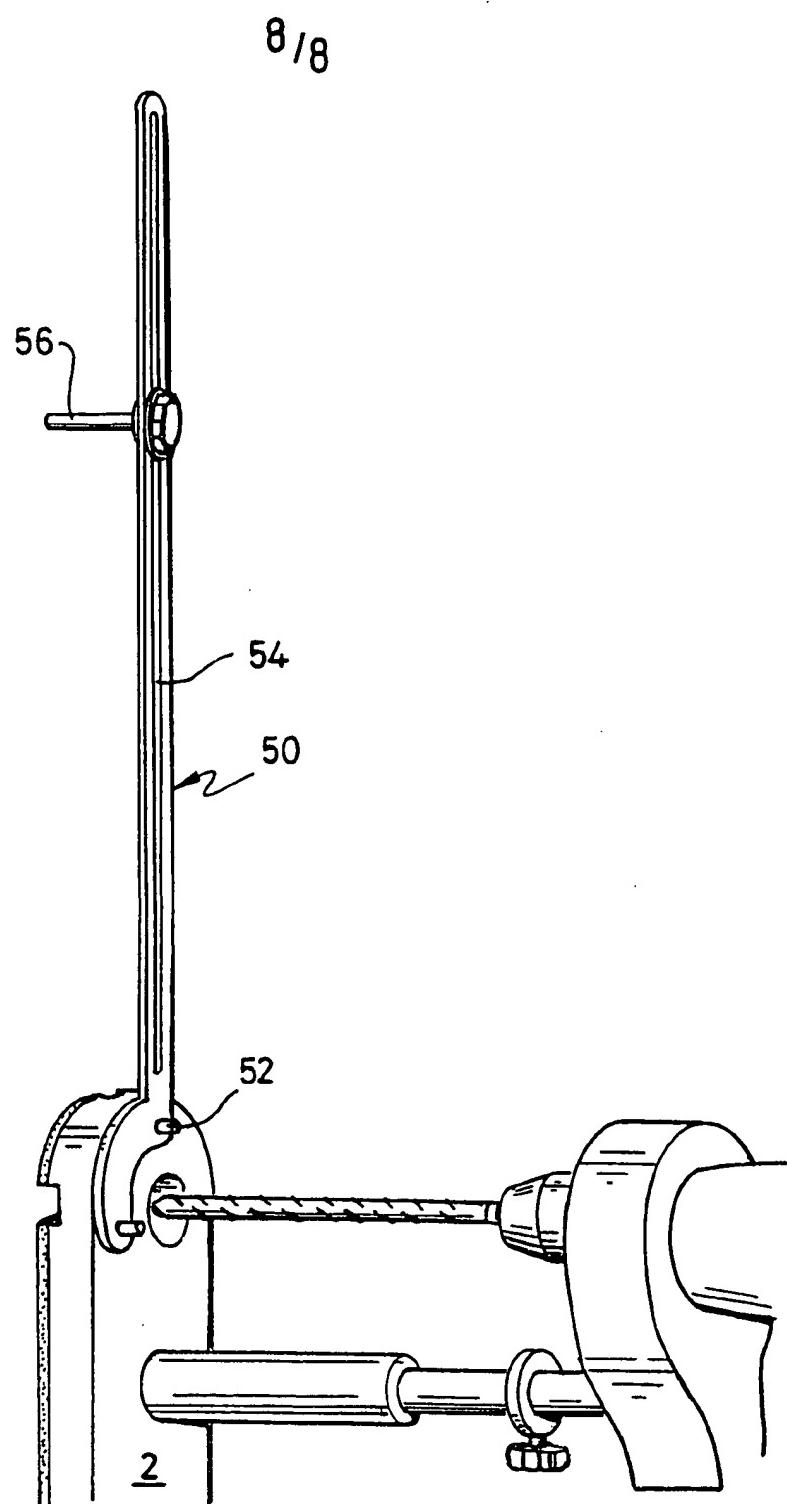


Fig. 8

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 98/01430

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B25H1/00

According to International Patent Classification(IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B25H B23Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	see the whole document ---	17,18
X	DE 14 27 015 A (PUGSLEY, LAWRENCE E., ESCONDIDO, CALIF.(V.S.T.A.)) 13 March 1969 see the whole document ---	1,2,4-6
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A	see the whole document ---	10,11
X	US 4 279 552 A (EPSTEIN IRA J) 21 July 1981 see the whole document ---	1,2,4,5
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Patent family members are listed in annex.

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European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Petersson, M.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 98/01430

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	PATENT ABSTRACTS OF JAPAN vol. 007, no. 165, 20 July 1983 & JP 58 071019 A (TOUSHIBA PLANT KENSETSU KK), 27 April 1983	1
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INTERNATIONAL SEARCH REPORT
Information on patent family members

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